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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/720,206	05/03/2001	Philip Guy	82402-3801	9235

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EXAMINER

CHUNDURU, SURYAPRABHA

ART UNIT	PAPER NUMBER
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1637

DATE MAILED: 02/08/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/720,206

Applicant(s)

GUY ET AL.

Examiner

Suryaprabha Chunduru

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 30 November 2001.
- 2a) ☒ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 22,23 and 28-38 is/are pending in the application.
- 4a) Of the above claim(s) 22 and 23 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 28-38 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____
- 4) ☐ Interview Summary (PTO-413) Paper No(s) _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION

Response to Arguments

1. Receipt of Amendment B (Paper No. 8) filed on November 30, 2001 is acknowledged.
2. Applicants' response and arguments filed in Paper No. 8, have been entered and are fully considered. Applicants cancelled claims 16-21, and 26-27. New claims 28-30 are added (Paper No. 8).
3. The Information Disclosure Statement (Paper No. 9) filed on January 11, 2001 has been entered.
4. Applicants arguments and amendment (Paper No. 8) with respect to the rejection under 35 U.S.C. 102(b) and 102(e) has been considered have been considered but are moot in view of the new ground(s) of rejection.

New Grounds of Rejection Necessitated by Amendment

Claim Rejections - 35 USC § 112

5. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 28-34 are rejected under 35 U.S.C. 112, second paragraph, as being incomplete for omitting essential elements, such omission amounting to a gap between the elements. See MPEP § 2172.01.

Method claims require a last step or phrase in the last step that states the accomplishment of the goals for the method, which were stated in the method's preamble. Claim 28 lacks such a last step (how an improvement of the agronomic properties is accomplished) and is confusing because the additional method step is not sufficiently set forth. While minute details are not

required in method claims, at least the basic steps must be recited in a positive, active fashion.

See Ex parte Erlich, 3 USPQ2d1011, p.1011 (Bd. Pat. App. Int. 1986). It is suggested that an amended claim more clearly describing the intended steps be submitted.

Claim Rejections - 35 USC § 102

6. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claim 28 is rejected under 35 U.S.C. 102(b) as being anticipated by Jacobsen-Lyon et al. (Plant Cell, Vol. 7: 213-223, 1995).

Jacobsen-Lyon et al. teach a method comprising providing a plant with nonsymbiotic plant hemoglobin and growing the plant (see page 214, column 2, paragraph 1, and page 222, column 1, paragraphs 1-4). Jacobsen-Lyon et al. further teach that the nonsymbiotic haemoglobin involvement in metabolic processes in a variety of plant tissues (see page 216, column 1, paragraph 1). Thus, the disclosure of Jacobsen-Lyon et al. meets the limitations in the instant claim.

Claim Rejections - 35 USC § 103

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 28-38 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bailey et al. (WO 98/12913) and in view of Sowa et al. (Proc.Natl.Acad.Sci.USA., Vol. 95: 10317-10321, 1998).

Bailey et al. teach a method for improving the agronomic properties of a plant wherein Bailey et al. disclose that the method comprises transforming a plant and providing a regenerated plant with increasing intracellular oxygen-binding protein (for example hemoglobin, leghemoglobin etc.) (see page 4, lines 10-18, page 30, lines 10-15, claim 15). Bailey et al. also disclose that the improved agronomic properties include rapid germination, improved vegetative yield (seedling vigour) and high levels of secondary metabolites whose production is oxygen sensitive (fermentation products) (see page 6, lines 19-29). Further Bailey et al. disclose that (i) the generation of plants with improved agronomic characteristics include metabolically engineering an increased oxygen level or increased utilization (uptake) of oxygen (see page 4, lines 10-18); (ii) increased drought tolerance (hypoxic conditions) (see page 9, lines 19-22); (iii) the transformed plants and their progeny are selected or screened (to use in plant breeding) plants that express the desired protein or altered expression of the oxygen binding protein

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(hemoglobin) which has the agronomic characteristics by the procedures well known in the art (see page 11, lines 12-21, page 12, lines 15-33, page 13, lines 6-15). However, Bailey did not disclose haemoglobin as nonsymbiotic plant haemoglobin.

Sowa et al. teach a method for altering hemoglobin levels wherein Sowa et al. disclose the cells transformed with sense nonsymbiotic barley hemoglobin showed high levels (10-fold higher) than wild type (see page, 10317, abstract, and page 10318, column 2, lines 1-8); nonsymbiotic haemoglobins are expressed in metabolically active tissue such as roots, aleurone, vascular tissues of leaves, stems, and seedlings cotyledons (see page 10320, column 1, paragraph 1), suggesting that germinating seeds higher expression of nonsymbiotic haemoglobins in germinating seeds or growing parts of plants.

Therefore, it would have been prima facie obvious to a person of ordinary skill in the art at the time the invention was made, to modify a method of improving agronomic properties of plants as taught by Bailey et al. with the method of using nonsymbiotic haemoglobin as taught by Sowa et al. to achieve expected advantage of improving agronomic properties of plants because Bailey et al. states that "in addition to attempts to alter primary metabolic compositions of plants (i.e. carbohydrates, oils, amino acids and proteins), it would also be desirable to alter secondary metabolites are those specialized plant products required by cells in small amounts (e.g. hormones), or highly specialized biomolecules. Generally, secondary metabolites can be defined as compounds that have no recognized role in the maintenance of fundamental life processes of the cell, but which may perform other advantageous functions for the organism as a whole (see page 1, paragraph 5). One such an alteration in a secondary metabolite, expressly motivated by Sowa et al. is to use nonsymbiotic haemoglobin to delineate the energy status of a

plant cell. An ordinary practitioner would have been motivated to combine the method of Bailey et al. with the method of Sowa et al. in order to achieve the expected advantage of developing a rapid and sensitive method for improving agronomic properties of plants.

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Suryaprabha Chunduru whose telephone number is 703-305-1004. The examiner can normally be reached on 8.30A.M. - 4.30P.M, Mon - Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Gary Benzion can be reached on 703-308-1119. The fax phone numbers for the organization where this application or proceeding is assigned are 703-308-0294 for regular communications and - for After Final communications.

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Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0196.

^{SPC}
Suryaprabha Chunduru
February 5, 2002


JEFFREY FREDMAN
PRIMARY EXAMINER